



Social Positivity Application (SoPost)

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Abstract: The Covid-19 pandemic has drastically changed the entire social world. During this pandemic everyone was on their phones scrolling or wasting time on these social networking sites. During this brief period of time, we noticed a lot of negativity on these social networking platforms in terms of hate speech, posts, video etc. In addition to that, studies have shown that this negativity on social media affects one's mental health and affects its productivity as well. The main objective of this project is to create a healthy social media platform that creates an optimistic environment thus allowing one to learn and entertain oneself while using social media. Furthermore, teenagers are the largest audience on social media and thus exposure to this kind of negativity at an early age can affect their future life. Proposed project is an application developed with help of Android and concept of Deep learning i.e CNN algorithm which detects images via data sets and see if the content is harmful or not. Moreover, the application also consists of a basic three report based system so that if the image gets slipped by the CNN algorithm the users using the application can report the content and can be removed easily. Conclusion, the proposed system provides a social networking platform with a healthy environment and finds the impact caused by positivity thus leading to greater productivity in oneself.

Keywords: Positivity, Productivity, Social media, CNN

I. INTRODUCTION

Social Media is a interactive technology that allows users to create and Share ideas, information, and various forms of thoughts via virtual network. Social media is available in various forms for instance blogs, business networks, social networking like Facebook, Instagram, LinkedIn etc. Now-a-days, it has become very efficient and easy for anyone to meet the people of their interest for learning and sharing their knowledge and information in the community. On an individual level, social media allows us to entertain ourselves and communicate with our friends and family. On Professional level, we can use social media as a tool to expand our knowledge and help us to create a professional network by connecting to individuals in the same industry.

Social Networking sites have completely changed the way information travels across the communities. A speedy flow of information and transparency have increased over the years drastically. Studies from similar sites have shown that people show the same kind of interest and motivation even if both the platforms are 95% similar. Thus, stating that social media has a huge market in the world. Using social media has become a daily routine for each and every individual. This has increased the quality and rate of collaborations for individuals as well as for the professional world.

However, these forums do have many demerits which affect people negatively. Sensitive/harmful content may affect someone's mental health which is a major issue observed in this recent pandemic. The majority of the audience on these platforms are teenagers, seeing violent photos or video may change their outlook to their future life. Thus, to avoid this issue we thought if there was a new forum which only focuses as well as promotes positive work made us to go with SoPost.

In this work we present a new system/platform is an Android application developed with the intention of removing all the negativity and creating a healthy and positive platform for all individuals. Users can post whatever they like and can promote their work. If any user tries to post content that consist of sensitive information like nudity, or harmful content like terrorism, blood-head etc would be immediately taken down using two main methods.

1. Three Report based system
2. Using CNN (Convolutional Neural Network) based Image Detection

Individuals who keep on posting positive content would be rewarded with badges. The user with the highest badge acts as a moderator for a day and can remove the post which might slip through the CNN algorithm with a single report/delete. Other basic features are the same as other social media (Instagram or twitter) followers, following count post feed, Main



feed, search field etc. This project is developed using Android studio that allows us to build applications and all the data of the app is stored in firebase. We used various datasets that consist of violent/harmful contents and trained them to find the perfect accuracy.

II. LITERATURE REVIEW

This paper addresses certain aspects of social media and the way it helps us to speak over such an oversized audience. it's undeniable that social media plays a very important role in impacting our culture, our economy and our overall view of the planet. Social media has removed communication barriers and created decentralized communication channels and opened the door for all to possess a voice and participate in an exceedingly democratic fashion.[1]

This paper points out what proportion of time is consumed by an individual on these platforms. What proportion of time does one spend on social networking sites, like Facebook, on a typical day?" Response categories ranged from 1 to 8 hours (more than 8 hours). The item remained the identical over the eight years of information collection although the examples.[2]

It mainly conveys how social media has two attributes positive as well as negative The effects of social networking are twofold.. Focus is on the particular field like health, business, education, society and youth. On the positive side, social networks can act as invaluable tools for professionals.On the negative side, the internet is laden with a number of risks associated with online communities. [3]

We aim to do just that, using an experimental design to determine how SNSs(Social Networking Sites) affect two positive self views: self-esteem and narcissism. A recent study of undergraduate Facebook users further supports this notion, finding that users report that sharing their personal preferences (e.g., political, religious, media) and posting photos helps them express themselves.[5]

In this paper we understood how social media actually helps students to improve their academics, impact of social media on academic performance and the possibility of using it as an effective tool to improve academic performance of students. In this regard, Zixiu, Xiongwen, Yuan, & Yifan (2011) used five sub-dimensions to represent the variables that are the resultant action of effective communication in student's learning. [6]

This paper emphasizes how positivity on social media actually helps boost one's productivity. A large number of people around the world believe that social media sites are time-wasters; however, various studies have shown just the other. Using social media sites may very well increase employee productivity. Studies have shown that employees who use social media sites are 9% more productive than those that don't (Fahmy, 2009). In a very similar study by Fahmy (2009), he found that 70% who used the net for private surfing resulted in sharpened employee's concentration. it's presumed that by taking short breaks, the brain is going to be refreshed and renewed.[7]

In this research paper on CNN we learned how CNN actually works from detecting images to actually training models. Convolutional neural network took off to a whole new level and really proved to work on the general- purpose domain of image recognition with the invention of AlexNet. The reason for the success of AlexNet is, with deep neural networks we have an architecture that is flexible, with layers of neurons being added, which increases the learning capacity of those networks. This resulted in the increased amount of training data. The next advantage was the use of machinery computational methods on GPUs to fetch the training data. Convolutional neural network (CNN) is a form of artificial neural networks that has specialization for being able to detect patterns and make sense of them; this pattern detection makes CNN useful for image analysis.[8]

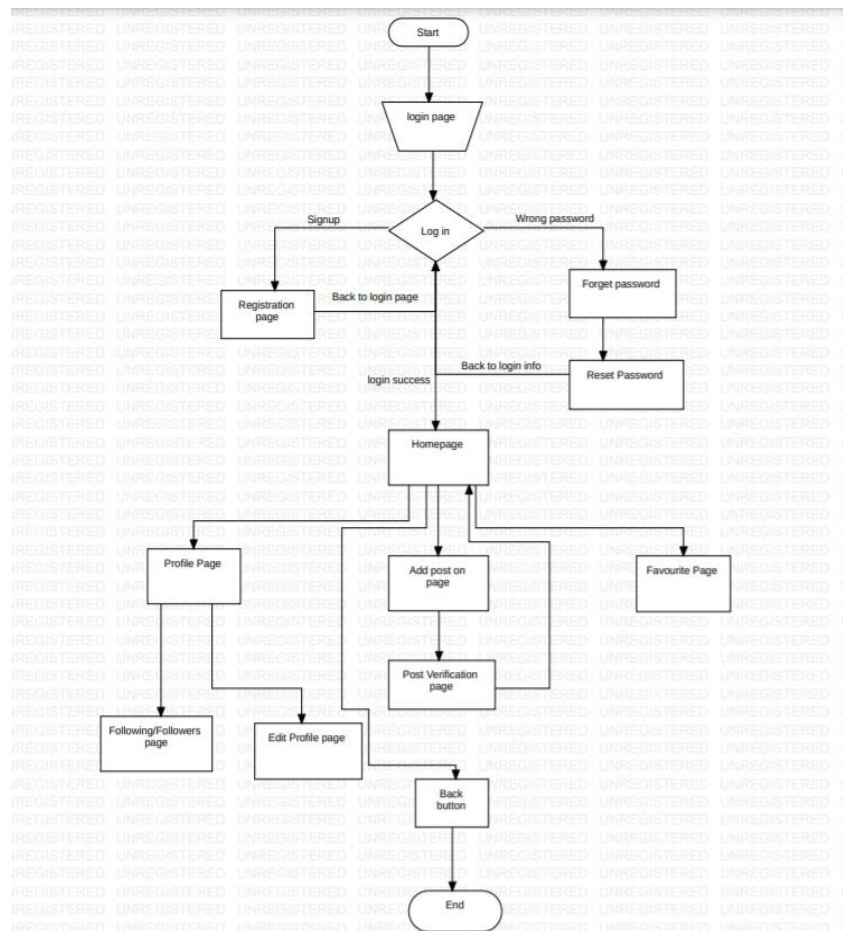
This paper conveys how deep learning can be used in Image Recognition and how we overcame few issues like Image classification, Object Detection and Image Verification. In image recognition, the distance between the n-dimensional vector of numeric features of the reference pattern and the feature vector of the input image is calculated. If the distance value is fewer than a certain definite value then the image is determined as matching and if the distance value is more, then it is determined as distinct. In deep learning, the issue of person identification is solved by designing a loss function (triplet loss function) that calculates the distance value between two images of the identical person as small, and therefore the value of distance with another person's image as large.[9].



III. IMPLEMENTATION

We will be developing an application which is a social media with different functionality not similar to other social networking sites i.e just a photo sharing app. Basically, users can post whatever content they want but the content should not be something negative or disturbing. If a user tries to post such content, the content before posting would be checked via CNN and if the content is tagged as negative the user won't be allowed to go further. To achieve this we have used various platforms i.e Android studio as our front-end for the development of application and Firebase as our back-end and Jupyter for training datasets.

The below figure depicts the overall architecture of the proposed system.



Design Approach:

This project relies on the functional design approach, which helps us in understanding the design of the project in a very simpler way by explaining its implementation more sort of in a modular approach. For instance, there are different modules in this project which have separate practicality and, other sub-modules. All these modules are designed, implemented and integrated together to create this working application.

A. Main Interface/Module:

This is one of the essential parts of the proposed project which consist of various submodules and also covers the necessary aspects of the project. Users who install the application are immediately taken to the Sign -up page where they Signup with basic necessary information like Name, Email address, password etc. Once the user enters the app, he/she is taken to the home screen where all the contents posted by the people they would be following in the future. User's can also access the profile page from here; they can alter their profile by changing the profile picture, updating bio and view their followers and following list. Fellow users can also post photos from the multi optional menu. We can search for a particular user using the search tab where you fill in the username.

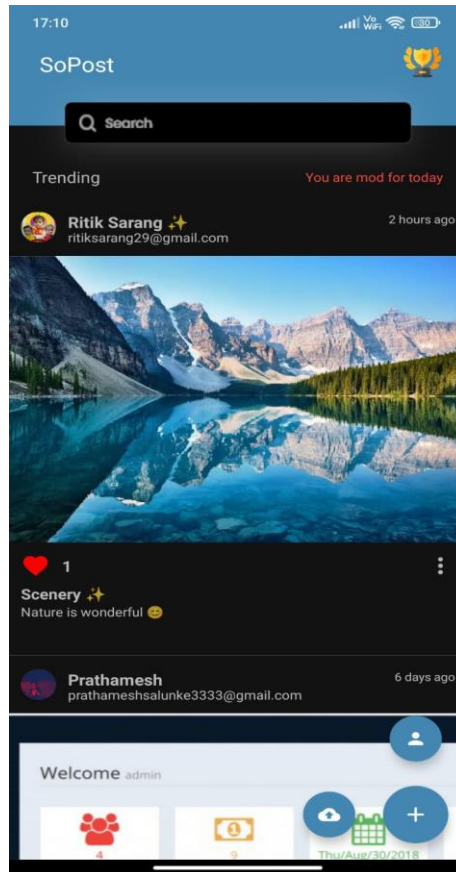


Fig. 1. Homescreen

B. CNN based Image Verification:

The information displayed below is taken from a single dataset of smoking cigarettes; similar procedures have been followed for other datasets as well.

i) Installing Fastai and vision

Firstly, we start by installing fastai in our system. It is a deep learning library which provides high-level components that can quickly and easily provide state-of-the-art results in standard deep learning domains.

```
In [33]: pip install fastai

Collecting fastai
  Downloading fastai-2.5.3-py3-none-any.whl (189 kB)
Collecting spacy<4
  Downloading spacy-3.2.3-cp38-cp38-win_amd64.whl (11.6 MB)
Collecting torchvision>=0.8.2
  Downloading torchvision-0.11.3-cp38-cp38-win_amd64.whl (947 kB)
Requirement already satisfied: requests in c:\users\abhil\anaconda3\lib\site-packages (from fastai) (2.25.1)
Requirement already satisfied: packaging in c:\users\abhil\anaconda3\lib\site-packages (from fastai) (20.9)
Collecting torch<1.11,>=1.7.0
  Downloading torch-1.10.2-cp38-cp38-win_amd64.whl (226.6 MB)
Requirement already satisfied: pyyaml in c:\users\abhil\anaconda3\lib\site-packages (from fastai) (5.4.1)
Requirement already satisfied: pandas in c:\users\abhil\anaconda3\lib\site-packages (from fastai) (1.2.4)
Collecting fastprogress>=0.2.4
  Downloading fastprogress-1.0.2-py3-none-any.whl (12 kB)
Requirement already satisfied: pillow>=6.0.0 in c:\users\abhil\anaconda3\lib\site-packages (from fastai) (8.2.0)
Collecting fastcore<1.4,>=1.3.22
  Downloading fastcore-1.3.29-py3-none-any.whl (55 kB)
Requirement already satisfied: scikit-learn in c:\users\abhil\anaconda3\lib\site-packages (from fastai) (0.24.1)
Collecting fastdownload<2,>=0.0.5
  Downloading fastdownload-0.0.5-py3-none-any.whl (13 kB)
Requirement already satisfied: scipy in c:\users\abhil\anaconda3\lib\site-packages (from fastai) (1.6.2)
Requirement already satisfied: pip in c:\users\abhil\anaconda3\lib\site-packages (from fastai) (21.0.1)
Requirement already satisfied: matplotlib in c:\users\abhil\anaconda3\lib\site-packages (from fastai) (3.3.4)
Collecting catalogue<2.1.0,>=2.0.6
  Downloading catalogue-2.0.6-py3-none-any.whl (17 kB)
Requirement already satisfied: tqdm<5.0.0,>=4.38.0 in c:\users\abhil\anaconda3\lib\site-packages (from spacy<4->fastai) (4.59.0)
Collecting preshed<3.1.0,>=3.0.2
  Downloading preshed-3.0.6-cp38-cp38-win_amd64.whl (113 kB)
Requirement already satisfied: numpy>=1.15.0 in c:\users\abhil\anaconda3\lib\site-packages (from spacy<4->fastai) (1.20.1)
Collecting cyemem<2.1.0,>=2.0.2
  Downloading cyemem-2.0.6-cp38-cp38-win_amd64.whl (36 kB)
Collecting thinc<8.1.0,>=8.0.12
  Downloading thinc-8.0.13-cp38-cp38-win_amd64.whl (1.0 MB)
Collecting pydantic<1.8.1,!=1.8.1,1.9.0,>=1.7.4
  Downloading pydantic-1.8.2-cp38-cp38-win_amd64.whl (2.0 MB)
Collecting blis<0.8.0,>=0.4.0
  Downloading blis-0.7.6-cp38-cp38-win_amd64.whl (6.6 MB)
Collecting pathy>=0.3.5
  Downloading pathy-0.6.1-py3-none-any.whl (42 kB)
Collecting regex<2.7.0,>=2.6.1
```

Fig. 2. Installing fastai

Once we install fastai in the system, we jump to the next step that is importing all the important modules from fastai vision. Fastai vision module contains all essential functions to define a dataset and train a model. As all the modules are installed successfully. We set the path where our image data set is stored in the system.

ii) Creating a function to label the images "Yes" or "No"

DataBlock is basically a blueprint on how we want to assemble our data. ImageBlock and CategoryBlock are used to specify that our inputs are images and our targets are categories. We use the `get_items` function to actually assemble the items or images inside the DataBlock. `get_y` is the function that we use to tell the DataBlock to label the items or images.

```
In [70]: def smoking_(x):
         return 'Yes' if parent_label(x)=='smoking' else 'No'

         image_set = DataBlock(
             blocks=(ImageBlock, CategoryBlock),
             get_items=get_image_files,
             get_y=smoking_,
             item_tfms=Resize(224))

         dls = image_set.dataloaders(Folder)

         dls.train.show_batch(max_n=8, nrows=4)
         dls.valid.show_batch(max_n=8, nrows=4)
```

Due to IPython and Windows limitation, python multiprocessing isn't available now. So 'number_workers' is changed to 0 to avoid getting stuck

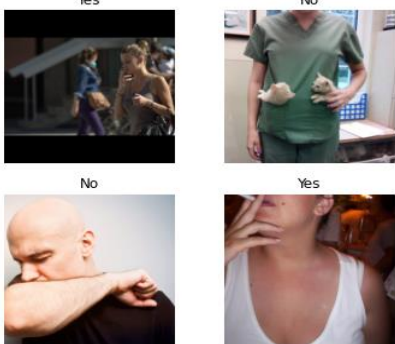


Fig. 3. Creating function to label

In this case, label the images as "Yes" or "No". Resize puts the images in a particular size frame. DataLoader is used to load the dataset that is to be used. "Folder" is the path where the dataset is stored. After loading the dataset, we display 8 images(in 4 rows), each from the training batch and validation batch.

iii) Training the model:

Convolutional neural network (CNN) is the factual form of neural network used for image classification. In terms of the architecture, resnet34 (i.e. 34 layers deep) is employed for the `cnn_learner` fast.ai function. ".fine_tune" method rather than ".fit" because we are leveraging on the pretrained resnet model to perform transfer learning. We specify the quantity of epochs to be 4. the quantity of epochs means the quantity of times each image is shipped within the training model. It doesn't mean that more epochs will increase the accuracy of the model. Larger number of epochs can result in overfitting, where the accuracy on training data will increase to an excellent value, but the accuracy on testing data or unseen images are low.

Train Loss is the value of the target function that you are minimizing. This value might be a positive or negative number, betting on the precise objective function of your training data. The training loss is calculated over the complete training dataset. Validation loss is the loss calculated on the validation set when the info is split to coach / validation / test sets using cross-validation. The error basically signifies how well your network is acting on a specific (training/testing/validation) set.

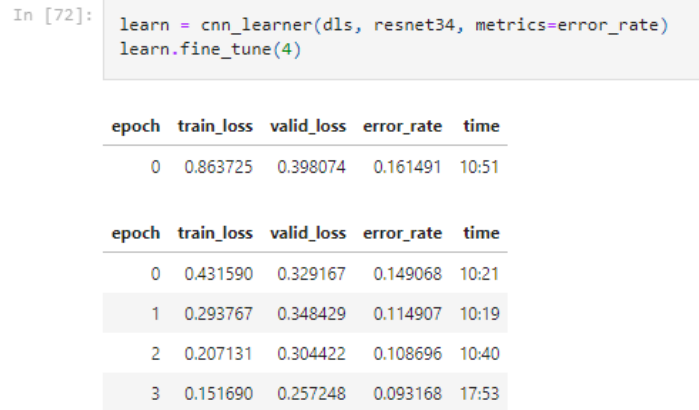


Fig. 4. Training Model

iv) Confusion matrix

A confusion matrix is a tabular matrix used to describe the performance of a classification model on a set of test data for which the true values are known. true positives (TP): These are cases in which we predicted yes (image contains harmful image). true negatives (TN): We predicted no,(images do not contain any harmful images that match the dataset). false positives (FP): We predicted yes, but they don't actually have the harmful content. (Also known as a "Type I error.") false negatives (FN): We predicted no, but they actually do have the harmful image (Also known as a "Type II error.")

```
[73]: interp = ClassificationInterpretation.from_learner(learn)
interp.plot_confusion_matrix()
```

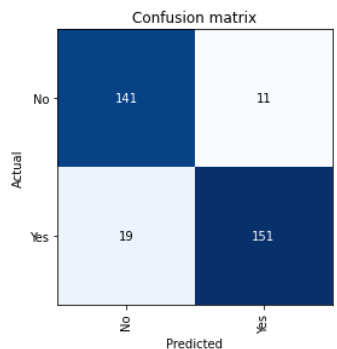


Fig. 5. Confusion matrix

Accuracy percentage can also be calculated using confusion matrix.

$$\text{Accuracy} = \frac{TP+TN}{TP+TN+FP+FN} \times 100 \text{ i.e., } \frac{141+151}{141+11+19+151} \times 100$$

6 epochs 89.1566% accuracy 4 epochs 90.6832% accuracy.

v) Displaying the images and predicting the unseen images.

After getting the correct output from multiple tests, we move ahead and test it by connecting trained models with the application and post the images from our camera roll.



Fig. 6. Classified as harmful



Fig. 7. Classified as not harmful

However, our main concern here was that even though we got the accuracy around 90% few images might slip through the CNN based image recognition. We can see that issue in the Fig 7 even though the image doesn't contain any harmful or sensitive data that matches with the dataset, yet it is classified 3.5% harmful. Therefore to overcome this issue, we came up with a few other solutions like the Three Report based system and badges.

c) Three Report based system

In this module, the users or the developers who find any post on the main feed that has slipped through the CNN image recognition can be easily removed by just reporting the content 3 times and the following post would be dropped immediately. Once the post is reported by the user, it would be declared as sensitive content for the user who reports; later if any other users report the same post 2 times it would be taken down.

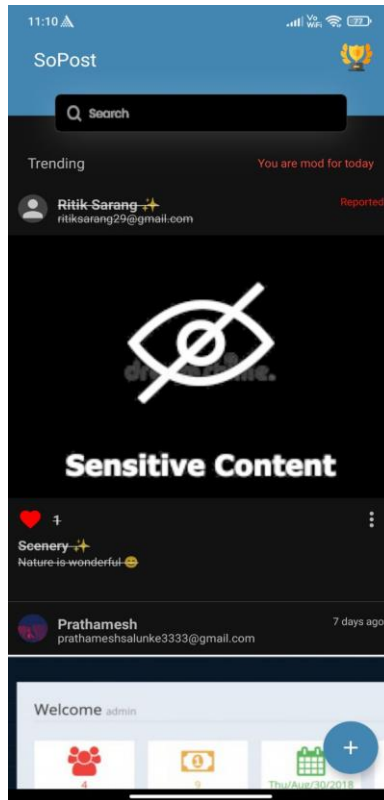


Fig. 8. Reported Image

D) Badges

Individuals who have been contributing to the community for a long time by only posting optimistic content are appreciated by receiving various badges. There are a total of 5 badges and depending upon the work, each user receives badges. The one with the highest amount of likes receives the highest badge and they act as a moderator for a day who monitors the feed . He/she can remove posts which are missed by CNN detection with a single report and the image would be dropped from the mainpage.

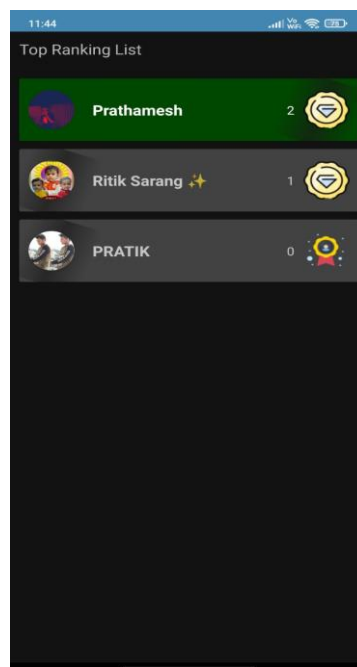


Fig. 9. Badges



IV. CONCLUSION

The objective of the project is to develop a well-rounded social media that only focuses on optimistic content which is capable of allowing people to use social media in a healthy environment. Out of several proposed features, we have successfully implemented the basic application development using Kotlin, connectivity of Firebase as our backend with the application, concept of deep learning i.e CNN based image detection, 3 report based system, including various badges. Thus, the proposed system is beneficial for everyone where people can spend time and learn new things and help them boost their productivity without affecting mental health.

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